

similar postmedial line angled at vein 6, the area between them except towards costa and the basal inner area suffused with dirty white; a series of black spots just inside termen, a terminal line, and line through cilia. Hind wing fuscous, with some rufous along vein 2 and on termen; a terminal series of black spots and two lines through the cilia.

♂ darker.

*Hab.* NATAL, Estcourt (*Hutchinson*), 1 ♀ type; Weenen, 1 ♂. *Exp.* 34 mm.

(3.) *Prosaris rufalis*, sp. n.

♀. Rufous; tarsi fuscous with pale rings. Fore wing rather thickly irrorated with fuscous brown; a dark ante-medial line, somewhat oblique from cell to inner margin; an oblique black line on discocellulars; postmedial line slightly excurved from costa to vein 4, then oblique; cilia tipped with fuscous. Hind wing paler rufous, slightly irrorated with fuscous. Underside of fore wing with indistinct dark spot in middle of cell; hind wing with curved postmedial line.

*Hab.* MASHONALAND (*Dobbie*), 1 ♀ type. *Exp.* 36 mm.

(1 a.) *Trebania glaucinalis*, sp. n.

*Trebania muricolor*, Leech, Trans. Ent. Soc. 1901, p. 431 (nec Hmps.).

Head, thorax, and abdomen brownish ochreous; palpi blackish brown at sides. Fore wing uniform glossy very pale olive-green, with traces of discoidal point and curved postmedial line, the costal edge and cilia brownish. Hind wing brownish white with a faint green tinge. Underside of fore wing browner; both wings with traces of a diffused curved postmedial line.

*Hab.* W. CHINA, Chang Yang (*Pratt*), 2 ♂, 1 ♀ type, Putsu-fang, 1 ♀, Kia-Ting-fu, 1 ♀, Ta-Chien-Lu (*Pratt*), 1 ♂. *Exp.* 34-38 mm.

[To be continued.]

XXXV.—*On Hipposiderus caffer*, Sund., and its closest Allies; with some Notes on *H. fuliginosus*, Temm. By KNUD ANDERSEN.

*Nomenclature.*

*Rhinolophus caffer*, Sund.; 1847\*.—The type was obtained by J. Wahlberg, "circa Port Natal." Sundevall's short

\* C. J. Sundevall, "Nya Mammalia från Sydafrika," Öfve. Kgl. Vet.-Akad. Förh. iii. no. 5 (May 13, 1846), pp. 115-119; Stockholm, 1847.

Latin description does not touch any of the characteristic features of the species, the only important points being the length of the "cubitus" (18 mm.) and the habitat. But the British Museum possesses a mounted specimen of *caffer* from Port Natal, presented by the Stockholm Museum, and in all probability collected by Wahlberg; the forearm of this specimen measures 47·5 mm., the maxillary width 6·2 mm., the upper tooth-row 6 mm.; secondly, Yngve Sjöstedt has published more detailed measurements of the type preserved in the Stockholm Museum\*, measurements which completely agree with those of the form called *caffer typicus* in the present paper; and, thirdly, *caffer typicus* is the only subspecies (and species) of *Hipposiderus* as yet recorded from Port Natal. These facts combined remove all doubt as to the identification of Sundevall's species.

*Phyllorhina gracilis*, Pters.; 1852 †.—Type from Tete, Lower Zambesi. The British Museum has specimens from other places at or near Zambesi (Shupanga, Mazoe).—Only two points in the original description of *gracilis* need some comment:—(1) the third metacarpal is stated to be a little longer than the fourth, in *caffer* a little shorter than the fourth; this character, however interesting from another point of view, has no taxonomic value; as a rule the third metacarpal is slightly the longer (see table of measurements and wing-indices below on p. 282), but in all races of *caffer*, and independently of age and sex, we find it sometimes equal to, sometimes a little shorter than, the fourth; the variation is purely individual: (2) the plagiopatagium is in *gracilis* inserted "etwas oberhalb der Fusswurzel," in *caffer* on the tarsus; I find in all races of *caffer*, independently of age and sex, the insertion of the wing-membrane to be a little variable, on the tarsus (very rarely on the base of the metatarsus) or between 0·5 and 2 mm. above the tarsal joint.—The rest of the very careful description, as well as the figures, clearly show that *Ph. gracilis* is, superspecifically at least, inseparable from *H. caffer*. The next question is, to which race of *caffer gracilis* belongs. The forearm measures, according to Peters, 46 mm.; this is probably the length of the radius, for in the life-size figure, pl. vii. fig. 1, the forearm measures 47·5 mm.; the length of the skull is 17·5 mm.; maxillary width (pl. xiii. fig. 15) 6 mm.; length of upper tooth-series (same plate, fig. 14) 6 mm. These facts, when compared with the table

\* Yngve Sjöstedt, Bih. Kgl. Svenska Vet.-Akad. Handl. xxiii. Afd. iv. no. 1, p. 18; Stockholm, 1897.

† W. Peters, 'Naturwissenschaftliche Reise nach Mossambique,' Säugeth. pp. 36-38, pl. vii. figs. 1-4; pl. xiii. figs. 14-15; Berlin, 1852.

of measurements below (p. 282), settle the identification: *Ph. gracilis* is a synonym of *H. caffer typicus* of the present paper.

Nineteen years later \* Peters arrived at the conclusion that *Ph. gracilis* was based on aged individuals of *H. caffer*, and pointed out the following four differences between old specimens and full-grown youngs: in old individuals the ears are longer; the third metacarpal always somewhat longer than the fourth (in young adults a little shorter than, or equal to, the fourth); the tibia longer; the wing-membrane inserted higher up on the tibia. I have carefully tested these statements on the large series, of all races and ages, at my disposal, and found that none of them holds good †; I often found in young adults (epiphyses of metacarpals not ossified) one, or several, or even all of the peculiarities believed by Peters to be characteristic of aged specimens. The slight variations are quite individual.

*Phyllorhina fuliginosa*, Temm.; 1853 ‡.—Based on a single specimen, an adult female, from the Gold Coast, collected by M. Pel. From Temminck's original description it appears that he separated *Ph. fuliginosa* from *Ph. caffer* mainly on account of its colour, which is stated to be "d'un roux de rouille vil" on the upperside; he gives the length of the forearm "2 ponce" (54.5 mm.), and mentions that the specimen has no frontal sac; as to the latter point he adds that the type and only individual examined being a female, "on ne peut indiquer . . . s'il est certain que le mâle soit pourvu d'un syphon." With regard to these three characters it must be said that the red colour of *fuliginosa* would be no proof of its specific distinctness, since also *H. caffer* has a red phase; that the forearm, if Temminck's statement were correct, would be only 0.5 mm. longer than in the largest *caffer* I have seen; and that the absence of a frontal sac in the female of *fuliginosa* does not imply that it is different from *caffer*, in which the sac is also invariably absent in the females. Thus the author of *H. fuliginosa* does not give us any means by which to distinguish it from *H. caffer*.

Peters § examined the type of *fuliginosa* in the Leiden Museum, and he had, furthermore, an example from

\* W. Peters, "Ueber die Gattungen und Arten der Hufeisennasen, *Rhinophi*," MB. Akad. Berlin, 1871, p. 325.

† See also my remarks on *H. Commersoni* and *gigas*, Ann. & Mag. N. H., Jan. 1906, p. 40, footnote.

‡ C. J. Temminck, 'Esquisses zoologiques sur la côte de Guinée,' pp. 77-78; Leiden, 1853.

§ W. Peters, MB. Akad. Berlin, 1871, p. 324.

"Guinea" in the Berlin Museum (no. 3559), referred by him to the same species. On the basis of these two specimens he writes:—(1) "Das Originalexemplar zu der Temminck'schen Beschreibung hat keineswegs die Behaarung der Rückseite, wie er sagt, lebhaft rostroth, sondern nur die Basis der Haare, während der freie Theil dunkelbraun erscheint, wie dieses auch nur mit seiner Benennung 'fuliginosa' (rauchbraun) zu vereinigen ist": (2) the length of the forearm is 50 mm.: (3) the species has no frontal sac.—But on closer examination these statements lose all practical value. Whether *H. fuliginosus* is red or brownish does not, in taxonomic respect, matter much, since both colour-phases occur in *H. caffer*; the length of the forearm (50 mm.) cannot have been taken on the type, for this latter is, as I shall have to show later on, a much larger bat, even markedly larger than indicated by Temminck; the measurement was probably taken by Peters on the Berlin specimen, and if so, *this cannot be a H. fuliginosus*; as to the absence of the frontal sac, a statement which, in fact, is correct also for the *males* of *fuliginosus*, I fail to see from where Peters derives it; he cannot have taken this character from the type, which is a female, and if he has based it on the Berlin specimen, we cannot rely upon its correctness, for this latter example is not a *fuliginosus*, provided the measurement of the forearm is correct. Thus, Peters does not add much to our knowledge of the true *fuliginosus*.

According to Dobson \* *H. fuliginosus* may at once be distinguished from *H. caffer* by the much larger thumb and foot, by the different form of the ears, and especially by the absence of a distinct frontal glandular sac. Most of these statements are true, but unfortunately Dobson himself arouses our suspicion as to their correctness, for the following reasons:—he gives as length of the forearm 1<sup>11</sup>/<sub>95</sub> (49.5 mm.), which is very far below the true size; the figure of the head (pl. ix. fig. 6) stated to be of a *fuliginosus* is undoubtedly drawn from a *H. caffer*; and of the four specimens registered by Dobson under *fuliginosus* three ("a," which is a female, not a male, "c," and "d") are *H. caffer*, therefore in strong contrast to his own description of *fuliginosus*, whereas the fourth ("b," a male, not a female) differs so widely from the other three specimens that I do not understand how Dobson could put them all under one heading.

So far the literature on the subject. Subsequent authors

\* G. E. Dobson, Cat. Chir. Brit. Mus. pp. 139-140, pl. ix. fig. 6; London, 1878.

not infrequently record "*H. fuliginosus*" from W. Africa, especially from the countries bordering the Gulf of Guinea and from the islands in the Gulf, but they do not give any definite reasons why they call their specimens *fuliginosus* and not *caffer*. In these circumstances I am much indebted to Dr. Jentink for having kindly given me some cranial and external measurements of the type of *fuliginosus*, on the strength of which I am able to definitely settle the identification of Temminck's species. The true *H. fuliginosus* is specimen "b" in Dobson's Catalogue (p. 110), a male, obtained in Old Calabar. This example and the type in the Leiden Museum are the only specimens known to me, with certainty, to exist in any collection. All other records of *H. fuliginosus* in literature—in so far as the authors give any information (apart from localities) about the specimens which they call *H. fuliginosus*, and provided that the information when given touches any characteristic feature—seem to rest on confusion with some race or other of *H. caffer*, most often, probably, with the race described below as *H. caffer guineensis*, which lives in the same region as *H. fuliginosus*, sometimes, it would seem, with *H. c. ventralis* or *angolensis*. The true *H. fuliginosus* may be briefly described as follows:—Similar to *H. caffer* in the general shape of the nose-leaves, the number of lateral leadlets (two), and the wing-structure, but differing, at a glance, by the much larger skull and teeth, by the markedly larger size, by the, also proportionately, much longer foot, and by the absence, in either sex, of a frontal sac; range, so far as hitherto known, from Old Calabar to the Gold Coast. This brief diagnosis, combined with the detailed measurements given below (p. 282), will easily prevent its confusion with any race or species of the *caffer* type.

*Phyllorhina bicorns*, Hengl; 1861\*.—The two typical specimens, a ♂ ad. and a ♀ ad. (in alcohol), from Keren, Erythrea, are preserved in the Stuttgart Museum. By the kindness of Prof. Dr. Lampert I have had them for examination in the British Museum. They are in every respect indistinguishable from the East-African, small-toothed and narrow-jawed form of *H. caffer* (*H. c. typicus*).

*Phyllorhina rubra*, Noack; Dec. 23, 1893†.—The type, a male (skin), obtained by Emin Pasha at "Lugerrunjere Fluss," German East Africa, is in the Berlin Museum. The

\* Th. v. Henglin, "Beiträge zur Fauna der Säugethiere N.O.-Afrika's," N. Acta Acad. Cies. Leop.-Car. xxix. pp. 7-8 (cf. p. 4); Jena, 1861.

† Th. Noack, "Neue Beiträge zur Kenntniss der Säugethier-Fauna von Ostafrika," Zool. Jahrb., Syst. vii. pt. iv. pp. 586-588, pl. xviii. figs. 11, 15; Dec. 23, 1893.

principal points in Noack's description are these two:—"An der Seite hat das Nasenblatt drei Falten"; and "die beiden Seiten der [Schwanz-] Flughaut sind statt des Schwanzes durch ein schmales schüßiges . . . Band getrennt, in welchem jede Spur von Schwanzwirbeln fehlt." Also it must be mentioned that Noack compares this bat with "*Phyllorhina bicolor*, var. *fulva*" and *Rhinonycteris aurantia*, but not with *H. caffer*; that the figures of the skull (figs. 14, 15), though stated to be "natürliche Grösse," are considerably larger than the measurements given by the author (pp. 587-588); and that the forearm is said to measure 52 mm.—Prof. Matschie, who, with customary kindness, consented to re-examine the type, informs me that it has two, not three, supplementary leaflets external to the horseshoe (in giving the number of "Falten" Noack probably counted the margin of the horseshoe together with the lateral leaflets); that the proximal tail-vertebræ have undoubtedly been extracted by the taxidermist\*; that a few distal vertebræ are still left in the tail-membrane; that all the skull-measurements (with one exception) as given by Noack are too large; that the forearm measures 51 mm.; and that the type is unquestionably a *H. caffer*. This evidence coincides with the result at which I myself had independently arrived by a perusal of Noack's exceedingly long and detailed description of *Ph. rubra*.—Some measurements of the skull placed at my disposal by Prof. Matschie enable me to determine still more precisely the affinities of *Ph. rubra*. The maxillary width, across the antero-external corners of  $m^3$ , is 6.7 mm.; the width across the cingula of the upper canines 4.5; the zygomatic width 10.2; the length of the maxillary tooth-series 6.4,—facts which all prove, conclusively, that the type of *Ph. rubra* is one of the (apparently rare) individuals which are intermediate between *caffer typicus* and *caffer centralis*. This result also agrees with the fact that *Ph. rubra* was obtained in that region of East Africa where the areas of the typical form and *c. centralis* overlap each other. There is a similar individual in the British Museum, from the same region.

*Phyllorhina angolensis*, Seabra; Dec. 1898.—In March 1897 Barboza du Bocage† pointed out some differences between the Angola representative of *H. caffer* and specimens

\* On this particular point see also Matschie, in SB. Ges. naturf. Fr. Berlin, 1894, p. 206, footnote.

† J. V. Barboza du Bocage, "Maníferos . . . d'Africa de que existem exemplares typicos no Museu de Lisboa," *Jorn. Sci. Math. &c. Lisboa*, (2), iv. no. 16, p. 183; March 1897.



"de outras proveniências d'Africa"; a technical name was, however, first proposed in the following year by Sr. de Seabra\*. In reply to some questions about *Ph. angolensis* Sr. de Seabra was kind enough to send a cotype (Rio Coroca, Angola; Sr. Auchieta coll.) as a gift to the British Museum.—I shall have to show later on in this paper that the characters emphasized by Bocage do not stand a practical test; but the Angola form differs in other respects, and the name *angolensis* therefore is to be retained.

*Synopsis of Species and Subspecies.*

Frontal sac present in males; forearm 42-51 mm.; foot (c. u.) 7.8-10.	
Forearm 46.5-54; tail 27.5-38; lower leg 18.8-22.8.	<i>caffer.</i> *
Maxillary width (across antero-external corners of $m^1$ ) 6-6.2; maxillary tooth-series 5.7-6.2; forearm 46.5-51.8 (average 48.6) . . . . .	<i>caffer f. typica.</i>
Maxillary width 6.8-7.1; maxillary tooth-series 6.7-7; forearm 49-54 (average 50.9) . . . . .	<i>caffer centralis.</i>
Maxillary width 7-7.7; maxillary tooth-series 6.8-7.2; forearm 48-53 (average 50.3) . . . . .	<i>caffer guineensis.</i>
Maxillary width 6.2-6.6; maxillary tooth-series 6.2-6.7; forearm 48-52.2 (average 50.3) . . . . .	<i>caffer angolensis.</i>
Forearm 42.2-44.2; tail 20.5-22; lower leg 15.2-16; maxillary width 7; maxillary tooth-series 5.9-6.2 . . . . .	<i>beatus.</i>
No frontal sac in either sex; forearm 57-61; foot (c. u.) 12.8; maxillary width 8.7; maxillary tooth-series 8.3 . . . . .	<i>fuliginosus.</i>

1 a. *Hipposiderus caffer*, Sund., *typicus*.

Small-toothed, small-skulled, and narrow-jawed.

The skull is smaller and in every respect slenderer than in *H. c. centralis*. The zygomatic width is equal to, or very often slightly smaller than, the mastoid width, a peculiarity which gives the skull a very characteristic aspect as compared with that of *H. c. centralis*. The maxillary width is markedly smaller: 6-6.2 mm., as against 6.8-7.1 in *centralis*; in conformance with this the width across the canines and the anteorbital width are smaller. The teeth are considerably smaller, the mandible shorter.

\* A. F. de Seabra, "Sobre um caracter importante para a determinação dos generos e especies dos 'Microchiropteros' e lista das especies d'este grupo existentes nas colleções do Museu Nacional," Journ. Sci. Math. &c. Lisbon, (2) v. no. 20, p. 256; Dec. 1898 (by a lapsus memoriae Seabra quotes Bocage as author of the name *angolensis*; Bocage (*l. s. c.*) called this bat *Phylorhina* n. sp., Seabra named it and described its palatal ridges).

Externally, the typical form is on an average smaller than *H. c. centralis*, but the difference is practically far less well marked than in the skulls. The following details illustrate the difference in the length of the forearm between *H. c. typicus* on the one side, *H. c. centralis* and *guineensis* (which for all practical purpose are identical in size) on the other:—In 40 full-grown specimens of *H. c. typicus* 46·5–51·8 mm., in 50 full-grown *H. c. centralis* and *guineensis* 48–53·8; thus, practically, for the discrimination of the races, the measurement of the forearm is far less reliable than the characters of the skull and teeth. But in *typicus* the average is 48·6, in *centralis-guineensis* 50·6. Of *typicus* only 10 per cent., of *centralis guineensis* 65 per cent., have the forearm 50 mm. or more.—There is no fixed difference in size between the sexes, neither in this race nor in the others.

The colour of the fur in the ordinary dark phase is markedly lighter than in *H. c. centralis* and *guineensis*:—Back light “Prout’s brown,” this colour confined to the tips of the hairs; base of hairs very light greyish “drab,” more or less tinged with “ceru-drab,” as is also the upperside of the head and neck and the whole of the underside; base of hairs of underside dark grey.—Young adults are still lighter coloured: Back more approaching “hair-brown”; head, neck, base of hairs of the upperside, as well as the whole of the exposed part of the underside, almost whitish grey; base of hairs of underside dark grey.

Also the red phase is markedly lighter than in *H. c. centralis* and *guineensis*:—Upperside throughout “orange-rufous”; underside between “orange-rufous” and “vinaceous-cinnamon.”—In this, as in all races of *H. caffer*, there are transitional stages between the dark phase and the red phase. All the red specimens are fully adult individuals. The red phase occurs both in males and females.

43 specimens\* have been examined, from the following localities:—Keren, Erythrea (2 spems., the types of *Ph. bicornis*); El Obeid, Kordofan (1) †; Ft. Hall, Mt. Kenia, British East Africa (2); El Dongo eb Urru, 415 miles up the Monbasa-Uganda Railway, B. E. A. (1); Machakos, B. E. A. (3); Kilimanjaro, German East Africa (2); Ft. Johnston, Nyasa (2) ‡; Shupanga, Lower Zambesi (5) §;

\* Only the measurements of full-grown specimens are included in the table below, p. 282.

† Oldfield Thomas, P. Z. S. 1903, i. p. 295; *H. caffer*.

‡ Oldfield Thomas, P. Z. S. 1896, p. 791; *H. caffer*.

§ J. Kirk, P. Z. S. 1864, p. 650; *Ph. gracilis* and *Ph. caffra*.



Mazoe, Mashonaland (4); De Kaap, Transvaal (1); Barberton, Transvaal (3); Zuurbron, Wakkerstroom (1)\*; Jususie Valley, Zululand (6)†; Pt. Natal (2); Pondoland (1); Huxé, Benguela (1); uncertain localities (4).—29 skulls, from all the localities enumerated, with the exception of Keren ‡.

According to this, the range of *H. c. typicus* is from Erythrea and Kordofan in the north, along the eastern side of the continent, southwards to Transvaal and Pondoland; it also occurs in Angola, where it probably is rather rare, and where it meets *H. c. angolensis*, the predominant form in that region.

1 b. *Hipposiderus caffer centralis*, subsp. n.

Large-toothed, large-skulled, and broad-jawed.

The skull is larger and in every respect more heavily built than in the typical form. The zygomatic width is almost invariably slightly larger than, or at least equal to, the mastoid width, which gives the skull in upper view a very characteristic aspect as compared with that of *H. c. typicus*. The maxillary width is markedly larger: 6·8–7·1 mm., as against 6–6·2 in the typical form; in conformance with this the width across the canines and the anteorbital width are slightly larger. The teeth are considerably larger, the mandible longer.

Externally, this form is *on an average* larger than *H. c. typicus*, but the difference is practically far less well marked than in the skulls and teeth (for details, see *H. c. typicus*).

The colour of the fur, both in the dark and red phase, is darker than in the typical form, but lighter than in *H. c. guineensis* (see this latter, below).

Type:—♂ ad. (skin). Entebbi, Uganda. Presented by F. J. Jackson, Esq. Brit. Mus. no. 99. 8. 4. 8.

26 specimens have been examined, from:—Takaungu, Mombasa, British East Africa (4); Dar es Salam, German East Africa (1); Zomba, Nyasa (1)§; Entebbi, Uganda (9); Stanley Falls, Upper Congo (3); Leopoldville, Lower

\* Oldfield Thomas & Harold Schwann, P. Z. S. 1905, i. p. 130; *H. caffer*.

† Oldfield Thomas & Harold Schwann, P. Z. S. 1905, i. p. 256; *H. caffer*.

‡ For some measurements of the skull of a ♀ ad. from Keren see A. Senna, Archivio Zoologico, ii. pt. iii. p. 274; Napoli, 1905; they are precisely as my measurements of *H. c. typicus*.

§ Oldfield Thomas, P. Z. S. 1894, p. 138; *H. caffer*.

Congo (2)\*; Wathen, Lower Congo (1); 75 miles up the Congo River (4)\*; Caiála, Bihé, Angola (1)†.—16 skulls, from all the localities enumerated.

According to this, *H. c. centralis* is distributed in a broad belt across the Equatorial region of Africa, from British and German East Africa and Nyasaland in the East, through Uganda and the whole of the Congo Valley, to the western coast of the continent; like the typical form it extends to Angola.

1 c. *Hipposideros caffer guineensis*, subsp. n.

The extreme in the maxillary width of the skull and the intensity of the colour of the fur.

The skull and teeth of this form are of the same size as in *H. c. centralis*, but the maxillary width on an average decidedly larger: 7–7·7 mm., as against 6·8–7·1.

External dimensions as in *H. c. centralis*.

The colour of the fur is markedly darker than in any other race:—Back approaching “seal-brown,” base of hairs scarcely lighter; upperside in front of the shoulders “hair-brown,” base of hairs next to “bistre”; underside dull “drab,” base of hairs next to “bistre.”—I have seen no very young specimen of this form.

Also the red phase is darker than in the other races:—Upperside “cinnamon-rufous,” in some individuals so dark as to approach “chestnut”; underside “cinnamon-rufous” or “hazel.” Different at a glance from the corresponding phase of the typical form.

Type:—♀ ad. (skin). Como River, 70 miles from Gaboon, almost sea-level; June 3rd, 1897. Collected by G. L. Bates, Esq. Brit. Mus. no. 97. 12. 1. 11.

27 specimens examined, from:—Como River (4); Gaboon (1); Benito River (4); Fernando Po (9)‡; Cameroon Mts. (1); Efulen, Bulu Country, Cameroon, 1500–1800 ft. (4); Old Calabar (1); Mt. Coffee, Liberia (3)§.—23 skulls, from all the localities enumerated.

According to this, *H. c. guineensis* is distributed from

\* From the collection of the United States National Museum (nos. 21663, 21664, and 102513–16).

† Oldfield Thomas & R. C. Wroughton, Ann. & Mag. N. H. (7) xvi. p. 170 (Aug. 1905); *H. caffer*.

‡ Oldfield Thomas, P. Z. S. 1904, ii. p. 183; *H. fuliginosus*.

§ From the collection of the U.S. National Museum (nos. 83800–802).—Gerrit S. Miller, Jr., Proc. Wash. Acad. ii. p. 647 (1900); *H. caffer*, partim.

Como River westwards, through the countries bordering the Gulf of Guinea (including the island of Fernando Po), at least as far as Liberia.

1 d. *Hipposiderus caffer angolensis* Seabra.

In cranial and dental characters and in colour intermediate between *H. c. typicus* and *H. c. centralis*; in external dimensions next to this latter.

Prof. Barboza du Boeage, who first drew attention to this form (*l. s. c.*), emphasized two distinctive characters: the slightly broader horseshoe and the coalescence of the right and left supplementary leaflets in front of the horseshoe. Neither of these points holds good. The horseshoe is not broader than in many individuals of *H. c. typicus* and *centralis*; as to the lateral leaflets, I find them meeting in front in two *H. c. angolensis* (one of them is a cotype of *Ph. angolensis*), separated, sometimes broadly separated, in all the others; on the other hand, in one *H. c. typicus* (Kilimanjaro) and two *H. c. centralis* (Stanley Falls) they are almost or quite connected in front of the horseshoe. The only claim of *H. c. angolensis* to have a technical name of its own is therefore that it is neither the typical form nor *H. c. centralis*, but intermediate between these races, and has a separate geographical distribution.

12 specimens (7 skulls) have been examined, from various places in Angola. I have reason to believe that this form extends northwards beyond the limits of Angola into the coast-region, where the predominant forms are *H. c. centralis* and *guineensis*.

2. *Hipposiderus beatus*, sp. n.

Smaller than *H. caffer*, with very short tail and tibia. Skull small and very broad-jawed.

In all forms of *H. caffer* the maxillary width (across the antero-external corners of  $m^3$ ) is practically equal to the length of the maxillary tooth series; in *H. beatus* the former is markedly greater than the latter (7 mm. as against 5·9–6·2); the great maxillary width, combined with the small size of the skull, makes the cranium of *H. beatus* easily distinguishable from that of any race of *H. caffer*. The zygomatic width is larger than the mastoid width, as in *H. c. centralis* and *guineensis*.

The teeth are of the same size as in the small-toothed *H. c. typicus*. The dentition, although in all essential respects

as in *H. caffer*\*, seems to be a trifle more advanced:  $p^2$  is in all the three specimens examined exceedingly small, so small indeed as to be very easily overlooked.

Externally this bat is readily distinguished from *H. caffer* by its small size and very short tail and tibia (see measurements below, p. 282). The wing-membrane is inserted on the middle or distal part of the metatarsus or on the base of the phalanges; in *caffer* it is never produced further backwards than the base of the metatarsus, and this but very rarely.

Type:—♀ ad. (in alcohol). 15 miles from Benito River; Feb. 1899. Collected by G. L. Bates, Esq. Brit. Mus. no. O. 2. 5. 45.—A second specimen (Brit. Mus. no. 5. 5. 23. 11), also obtained by Mr. Bates, is from Efulen, Cameroons. A third specimen †, from Mt. Coffee, Liberia, is preserved in the Washington Museum (no. 83857) ‡.

Judging from this, *H. beatus* is distributed over the countries bordering the Gulf of Guinea, from Benito River to Liberia. Thus it inhabits the same region as the large-skulled and large-toothed *H. c. guineensis*.

#### General Remarks.

The conclusions recorded in the foregoing pages are based on a study of 111 specimens and 79 skulls, from localities scattered over almost the whole explored part of the Ethiopian Region. Without so extensive a material—probably the largest ever brought together in one place—I should not have ventured an attempt to disentangle the various species and geographical races of this particularly difficult group of

\* Dentition in 76 skulls of *H. caffer* (all races):— $p_3$  always wanting.  $p_2$  and  $p_4$  never separated; in 10 specimens in simple contact, in 66 overlapping each other at base.  $p^2$  always external to the series and always easily observable. Upper canines and  $p^1$  in 21 specimens distinctly separated; in 39 extremely slightly separated or almost in contact; in 3 completely in contact on one side of the jaw only, in 13 on either side.

† For the loan of this specimen I am indebted to the Authorities of the United States National Museum. It is one of the *Hipposideros caffer* mentioned by Gerrit S. Miller in his paper on a collection of small mammals from Mount Coffee, Liberia (Proc. Wash. Acad. ii. (1900) p. 647; forearm 42 mm.).

‡ A fourth specimen, not examined by me, is in a Continental (probably Swedish or German) Museum:—In his "Säugethiere aus Kamerun, West-Afrika" (Bih. Kgl. Svenska Vet.-Akad. Handl. xxiii. Afd. iv. no. 1, p. 18; 1897) Dr. Yngve Sjöstedt gives some external measurements of 10 "*H. caffer*"; no. 1 is Sundvall's type, from Port Natal; nos. 2-8 and 10, all from Cameroon, are probably *H. c. guineensis*; no. 9, also from Cameroon, with the forearm measuring 44 mm., the tail 24, and the tibia 16, is undoubtedly a *H. beatus*.

bats. The taxonomic and zoogeographical facts, as derived from an examination of this material, may be briefly epitomized as follows:—

(1) A small toothed and narrow-jawed form, *H. caffer typicus*, occurs from Erythraea and Kordofan in the north, through British East Africa, German East Africa, Nyasaland, and Lower Zambesi, to Transvaal, Zululand, and Pondoland; a perfectly continuous area, comprising the eastern side of the continent. I know of no record of any bat of the *caffer* type north of Erythraea or south of Pondoland.—From the southern part of this area, no doubt through the Zambesi Valley, this form has spread to Angola. There are parallels to this among other Ethiopian species of Horseshoe-Bats: *H. Commersoni*, essentially East-African, but occurring also in Angola\*; *Rhinolophus Darlingi*, distributed from Mazoe to Angola†.

(2) A large-toothed and broad-jawed form, *H. c. centralis*, inhabits the Equatorial region of the continent, from the Congo Estuary in the west, through the whole of the Congo Valley and Uganda, to British and German East Africa.

It will be observed that the geographical areas of these two forms overlap each other in the east; from the southern part of British East Africa to Zomba, *i. e.* within the area where *H. c. typicus* is the predominant form, we also find *H. c. centralis*. When the two forms occur together we might anticipate, in view of their very close relationship, that intermediate specimens would prove to be rather common. Such is, however, not the case; the two races preserve, also in these circumstances, their peculiarities, so well indeed that, with very rare exceptions, they are distinguishable at a glance by their cranial and dental characters. I know of only two intermediate examples, the one in the British Museum (from Zanzibar), the other in the Berlin Museum (from German East Africa; the type of *Ph. rubra*).

The reason why *H. c. centralis* inhabits a part of the area occupied by *H. c. typicus* is probably this:—All the examples I have seen from Uganda and the Congo Valley are perfectly clearly pronounced *H. c. centralis*; it is therefore but reasonable to suppose that this “*chau area*,” Uganda and the Congo Valley, is the true home of *H. c. centralis*, and that from there it has spread eastwards into British and German East Africa, south-eastwards to Zomba.

\* Knud Andersen, Ann. & Mag. N. H., Jan. 1906, p. 41, footnote, and p. 47.

† Id., Ann. & Mag. N. H., Jan. 1905, pp. 71-72; P. Z. S. 1905, ii, p. 115.

Table of Measurements.

	<i>H. caffer.</i>				<i>angulensis.</i> 8 spems., 7 skulls.				<i>H. beatus.</i> 3 spems., 2 skulls.				<i>H. caffer &amp; beatus.</i> 100 spems.		<i>H. fuliginosus.</i>
	<i>f. typica.</i> 40 spems., 29 skulls.		<i>centralis.</i> 24 spems., 16 skulls.		<i>guineensis.</i> 26 spems., 23 skulls.		<i>angulensis.</i> 8 spems., 7 skulls.		<i>H. beatus.</i> 3 spems., 2 skulls.		<i>H. caffer &amp; beatus.</i> 100 spems.		<i>H. fuliginosus.</i>		
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	mm.
Skull, total length to front of canine.....	17.2	18.3	18.5	19.7	18.5	19.8	17.8	18.8	16.8	16.9	.....	.....	.....	.....	.....
" basilar length to front of canine.....	13.1	14	14	15.2	14.2	15.2	13.3	14.3	13	13.5	.....	.....	.....	.....	.....
" mastoid width .....	9.2	9.8	9.5	10.6	10	10.7	9.8	10.2	9.2	9.2	.....	.....	.....	.....	.....
" width of brain-case .....	7.9	8.3	8.2	9	8.5	9.1	8.2	8.9	7.8	8.1	.....	.....	.....	.....	.....
" zygomatic width .....	9	9.8	10	11	10.2	11.2	9.3	10.2	9.7	9.8	.....	.....	.....	.....	.....
" maxillary width.....	6	6.2	6.8	7.1	7	7.7	6.2	6.6	7	7	.....	.....	.....	.....	12.5
" anteorbital width.....	4.5	4.9	4.8	5.1	5	5.2	4.8	5	5	5.1	.....	.....	.....	.....	8.7
" across cingula of canines .....	3.9	4.3	4.3	5	4.8	5	4.2	4.6	4.3	4.7	.....	.....	.....	.....	6.2
Mandible .....	10.7	11.5	11.7	12.8	11.8	13	11.1	12	10.7	11.3	.....	.....	.....	.....	6
Upper teeth .....	5.7	6.2	6.7	7	6.8	7.2	6.2	6.7	5.9	6.2	.....	.....	.....	.....	15
Lower teeth .....	6.2	6.8	7.2	7.8	7.3	8	6.9	7.2	6.2	7	.....	.....	.....	.....	8.3
Ears, length .....	13	15	14	15	14	15	13.2	15.2	13.2	13.5	.....	.....	.....	.....	15.8
" greatest breadth.....	14	16.5	15	17.8	15.2	17.8	15	17	14	14	.....	.....	.....	.....	17.2
Horseshoe, greatest breadth .....	4.8	6.1	4.8	6.5	6	6.8	5.7	6.1	5.8	6.1	.....	.....	.....	.....	7
Posterior leaf, breadth.....	6	6.8	6.2	7	6.3	7	6	7	7	7	.....	.....	.....	.....	8
Forcarn .....	46.5	51.8	49	53.8	48	52.8	48.2	52.2	42.2	44.2	.....	1000	.....	.....	61
3rd metacarpal.....	33.5	38.2	35.8	39.8	35.2	39.8	34.8	38	32.5	33	.....	745	.....	.....	45
III. <sup>1</sup> .....	14.2	16.8	14.4	18	16	18.3	15	16.7	13.7	14.8	.....	321	.....	.....	19
III. <sup>2</sup> .....	15	17.8	15.2	19	15.5	20	15	19	16.6	17.2	.....	343	.....	.....	20.8
4th metacarpal.....	33	38.8	35.2	40	34.2	38	35	37.7	31	31	.....	731	.....	.....	42.7
IV. <sup>1</sup> .....	9.3	11.2	10.2	12.7	11	12.7	10.8	12	9.8	10.2	.....	222	.....	.....	12.2
IV. <sup>2</sup> .....	8	10.2	9	11	8.7	10.8	8.7	10	8.8	9.5	.....	190	.....	.....	10.8
5th metacarpal .....	29	34	30	35.3	30.8	34.7	31	34	28.8	29.5	.....	652	.....	.....	39
V. <sup>1</sup> .....	12	14	12.5	15.1	11.8	14	12.8	13.8	10.2	11.6	.....	267	.....	.....	14.8
V. <sup>2</sup> .....	9.2	11.5	9.6	12	9	11.2	9.7	10.8	8.9	10	.....	210	.....	.....	10.5
Tail .....	30	35	28.8	34.8	27.5	32	28	36.8	20.5	22	.....	.....	.....	.....	34
Lower leg .....	19.3	22	19.3	22.8	18.8	20.5	20	22	15.2	16	.....	.....	.....	.....	23.5
Foot, with claws .....	8	9.4	8.3	10	8.7	9.5	8	9.5	7.8	8.5	.....	.....	.....	.....	12.8



(3) A large-toothed and very broad-jawed form, *H. c. guineensis*, inhabits the countries from Como River to Liberia. This area is a direct western continuation of the region inhabited by *H. c. centralis*, and, in accordance with this fact, *H. c. guineensis* is nothing but an "exaggeration" of *H. c. centralis*; one of the chief characters of *centralis*, the large maxillary width, finds a climax in *guineensis*.

(4) Angola is, geographically, intermediate between the areas of *H. c. typicus* and *H. c. centralis*; and we find in Angola a representative of the *caffer* type, *H. c. angolensis*, which in almost every respect is thoroughly intermediate between the two races.—The geographical position of Angola is such as to have invited *H. c. typicus* to immigrate from east (Zambesi Valley), *H. c. centralis* to immigrate from north-east (Congo Valley); thus we find in Angola three forms of *H. caffer*: not only *H. c. angolensis*, the predominant form, but also *H. c. typicus* and *H. c. centralis*.

(5) In the Guinean coast-region, from Benito River to Liberia, lives a representative of the *caffer* type, *H. beatus*, which in its cranial and external characters is so sharply separated from all the forms just mentioned that we have no other choice than to regard it as a distinct species.

(6) Finally, in the region inhabited by *H. c. guineensis* and *H. beatus*, from Old Calabar to the Gold Coast, we find the very different *H. fuliginosus*. It has been necessary to give an account of this species in the present paper, owing to its confusion with *H. caffer*. But it belongs to a different group of the genus.

The probable phylogeny of *H. caffer*, *beatus*, and *fuliginosus* will be discussed in a subsequent paper, on some Oriental species of *Hipposiderus*.

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XXXVI.—*New and little-known Species of Heterocera from the East.* By Colonel C. SWINHOE, M.A., F.L.S., &c.

Family Deltoididæ.

*Oxænanus indentifascia*, nov.

♂ ♀. Of a uniform dark olive-brown; palpi with ochreous-white hairs, the sides nearly black: fore wings with the orbicular and reniform black, the first represented by a small spot, the other larger and ear-shaped; antemedial and post-medial lines whitish and sinuous, the first edged with black